Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

HEAD-MOUNTED PHOTOMETER SYSTEM FOR AIRBORNE LUMINANCE MEASUREMENT

The Human Effectiveness Directorate developed a head-mounted photometer (HMP) system that a pilot wears during flight to record the pilot's luminance exposure during an extended period. The data are then used to characterize and mathematically model the effects of different visor and aircraft transparency transmissivities on the warfighter's visual performance.

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Accomplishment

Directorate engineers designed, built, and tested the new system for airborne applications. The HMP is a rugged, compact, battery-powered system that a pilot wears during flight.

The system is composed of an optical light sensor that is attached to the side of the pilot's helmet and measures the lighting conditions in the general direction of the pilot's gaze. It is electronically connected to a data recorder that is worn in the pocket of the survival vest. The HMP system enables the collection of large amounts of luminance data during extended periods and under a wide variety of flight conditions.

Background

In order to more accurately design optical coatings, helmet visors, and aircraft transparencies, it is necessary to determine the ambient luminance conditions that warfighters are exposed to during flight. The HMP system was developed to collect these data.

Once the luminance ranges are sufficiently characterized, the effects of different transparent elements can be mathematically modeled. These results may affect the design of many visors, aircraft transparencies, including their coatings, as well as laser eye protection. For example, the current transmissivity specifications may be modified to enhance air-to-air target acquisition performance. The HMP is a viable tool for use in addressing human factors issues associated with the development of transparency technologies.

Human Effectiveness
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (04-HE-11)